

REMARKS

The present Amendment replaces the Amendment filed on January 3, 2011 in its entirety and responds to both the Final Office Action dated November 2, 2010 and the Advisory Action dated January 10, 2011. This Amendment is being filed in connection with a Request for Continued Examination.

Applicants have carefully reviewed the Final Office Action dated November 2, 2010 and the Advisory Action dated January 10, 2011, and thank Examiner Saad for the detailed review of the pending claims. Applicants have amended claim 1. Support for the amendments to claim 1 may be found at least in Paragraph [0045] of the application. Applicants have also added new claims 32-34. No new matter has been added by way of these amendments. Accordingly, claims 1 and 19-20, and 22-34 remain pending in this application.

At least for the reasons set forth below, Applicants respectfully traverse the foregoing rejections. Further, Applicants believe that there are also reasons other than those set forth below why the pending claims are patentable, and reserves the right to set forth those reasons, and to argue for the patentability of claims not explicitly addressed herein, in future papers. Further, for any instances in which the Examiner took Official Notice in the Office Action, Applicants expressly do not acquiesce to the taking of Official Notice, and respectfully request that the Examiner provide an affidavit to support the Official Notice taken in the next Office Action, as required by 37 CFR 1.104(d)(2) and MPEP § 2144.03.

Applicants respectfully request reconsideration of the present application in view of the above amendment and the following remarks.

Claim Rejection – 35 U.S.C. § 103

1. Lürenbaum (DE725619) in view of Myers (U.S. Patent No. 6,811,633), and Holland (U.S. Patent No. 5,139,704)

Claims 1, 19-28, 30, and 31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lürenbaum in view of Myers and Holland. Applicants respectfully traverse the rejection.

Independent Claim 1

Hollow Shaft

Independent claim 1 recites “[a] process for fixing at least one balancing weight to at least one location on a hollow shaft, for torque transmission at rotational speeds in the range of 3000 rpm to 12000 rpm in a drive system for a vehicle, comprising securing the at least one balancing weight to the at least one location by soldering without a shielding gas, wherein a flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².” Lürenbaum, alone or in reasonable combination with Myers and Holland, fails to teach, suggest, or disclose every recitation of claim 1.

“To establish *prima facie* obviousness of a claimed invention, all the claim recitations must be taught or suggested by the prior art.” *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). M.P.E.P. § 2143.03. *Accord*. M.P.E.P. § 706.02(j). The Examiner admitted that “Lürenbaum does not specifically state that the shaft is hollow” and, therefore relied on Myers to teach joining balancing weights to a hollow driveshaft. Thus, the Examiner argues that “it would have been obvious to use the method of soldering balancing weights of Lürenbaum to balance the hollow driveshaft of Myers.” (*See* Office Action, p. 2). Applicants respectfully disagree with this position.

Lürenbaum is directed toward balancing unbalanced shafts. According to a machine translation of the text of Lürenbaum, to balance the shafts, imbalance masses are welded on, in the form of a sheet metal, the shaft body, which can be soldered or glued. (*See* translation, lines 1-3.) Further, Lürenbaum suggests that gluing balancing sheets on the shaft achieves a higher fatigue strength in the adhesion joint, than, for example, soft soldering can reach, thereby teaching away from the desirability of soldering. Indeed, Lürenbaum teaches that since the fatigue strength of the shaft does not become affected by gluing as with soldering, particular advantages then can be achieved. (*See* translation, lines 11-13.)

In the Office Action, the Examiner noted that “Lürenbaum discloses soldering balancing weights to a shaft. Lürenbaum was silent to the shaft being hollow.” Thus, the Examiner used Myers “as a secondary reference to show that it is well known to attach balancing weights to a hollow shaft.” (*See* Office Action, p. 8). However, as discussed in more detail below, Myers

teaches that an adhesive material is used to secure a balance weight to a drive shaft, not a soldering process.

Indeed, as illustrated in FIG. 2 of Myers, reproduced below, Myers teaches that an adhesive material is applied to the outer surface of the driveshaft section 17, the inner surface 44 of the balance weight 40, or both. When the balance weight 40 is pressed against the driveshaft section 17, a first portion of the adhesive material is extruded outwardly and a second portion is extruded upwardly. The first and second extruded portions are then exposed to an accelerated curing process in order to temporarily secure the balance weight 40 to the driveshaft section 17. (*See* Col. 5, lines 36-50). However, nowhere does Myers disclose soldering the balancing weight 40 to the driveshaft section 17.

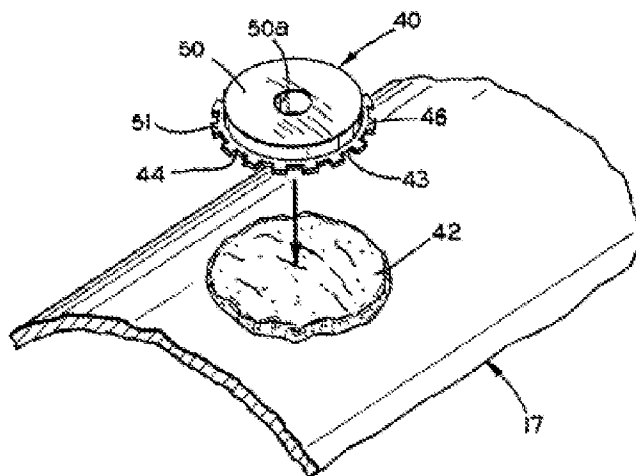


FIG. 2

In fact, not only does Myers fail to disclose soldering balance weight 40 onto the driveshaft section 17, it also teaches away from causing undesirable localized heating of the driveshaft when securing the balancing weight 40 to the driveshaft section 17. More specifically, Myers discloses that “ultraviolet radiation is a preferred accelerated curing process because it does not cause undesirable localized heating of the driveshaft.” Therefore, it would not have been obvious to combine the method of soldering balancing weights disclosed in Lürenbaum, which would require

the application of localized heating, to balance the hollow driveshaft of Myers, especially as even Lürenbaum explicitly states that soldering can compromise the fatigue strength.

Even if Lürenbaum discloses “soldering balancing weights to a shaft,” the use of Myers “as a secondary reference to show that it is well known to attach balancing weights to a hollowing shaft” is improper because Myers expressly teaches the use of an adhesive material to secure a balance weight. Moreover, Myers teaches away from causing undesirable localized heating of the driveshaft when securing a balancing weight, which soldering would necessarily impart. Therefore, the combination of Lürenbaum which discloses the particular advantages of adhesives while teaching away from the desirability of soldering and Myers which is directed to use of an adhesive material to secure a balance weight to a drive shaft does not teach “securing the at least one balancing weight to the at least one location by soldering.”

Accordingly, the combination of Lürenbaum and Myers does not teach, at least, “[a] process for fixing at least one balancing weight to at least one location on a hollow shaft...comprising securing the at least one balancing weight to the at least one location by soldering” within the context of claim 1. Holland also fails to make up for this inadequacy. Indeed, Holland fails to teach joining balancing weights to a hollow driveshaft. Thus, independent claim 1 is patentable over Lürenbaum in view of Myers and Holland for at least this reason. Applicants respectfully request withdrawal of the rejection.

Tensile Strength

Independent claim 1, as amended, also recites in part, “securing the at least one balancing weight to the at least one location by soldering without a shielding gas, wherein a flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².” Lürenbaum, alone or in combination with Myers and Holland, fails to teach, suggest, or disclose at least this recitation of claim 1.

As discussed above, Lürenbaum teaches to balance unbalanced shafts, imbalance masses are welded on in the form of a sheet metal on the shaft body. (*See* translation, lines 1-3.) However, fails to teach, suggest, or disclose that “a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².”

Holland also does not disclose this limitation. Holland is directed to a fluxless solder for application to metal surfaces, wherein the solder includes additives which remove contaminating oxides during the soldering process. (See Col. 2, lines 44-51). However, Holland fails to teach, suggest or disclose that “a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².”

Similarly, Myers also fails to cure the deficiencies of Lürenbaum and Holland. As discussed above, Myers discloses the use of an adhesive material applied to the outer surface of the driveshaft section 17, the inner surface 44 of the balance weight 40, or both. However, nowhere does Myers disclose that “a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².”

Accordingly, Lürenbaum, alone or in combination with Myers and Holland, fails to teach, suggest, or disclose at least this recitation of claim 1. Therefore, independent claim 1 is patentable over Lürenbaum in view of Myers and Holland for at least this reason. Applicants respectfully request withdrawal of the rejection.

Shielding Gas

Independent claim 1 also recites, in part “securing the at least one balancing weight to the at least one location by soldering without a shielding gas.” Lürenbaum, alone or in reasonable combination with Myers and Holland, fails to teach, suggest, or disclose at least this recitation of claim 1.

As an initial matter, the Examiner admitted that Lürenbaum “does not specifically state using a shielding gas for the soldering process.” Nonetheless, the Examiner took the position that a shielding gas is not being used. (See Office Action p. 9). This argument is insufficient to establish a *prima facie* case of obviousness. The Examiner must establish that all of the claim recitations are taught or suggested in the prior art. To meet this burden, the Examiner cannot interpret Lürenbaum’s silence on the use of a shielding gas as verification that Lürenbaum discloses soldering without the use of a shielding gas. The Examiner must show that “securing the at least one balancing weight to the at least one location by soldering without a shielding gas” is taught or suggested in the prior art.

Myers fails to cure at least this deficiency of Lürenbaum. As previously discussed, Myers teaches an adhesive material applied to the outer surface of the driveshaft section 17, the inner surface 44 of the balance weight 40, or both. However, Myers is not directed toward soldering nor does Myers disclose a soldering process. Therefore, Myers fails to teach, suggest, or disclose “securing the at least one balancing weight to the at least one location by soldering without a shielding gas.”

Accordingly, the Examiner relied on Holland to disclose “that the fluxless solder may be used in a vacuum atmosphere,” on the basis that “[t]his would indicate that no gas is present during the soldering process.” (*See* Office Action p. 9). However, as disclosed in the specification of the present application, the claimed process is advantageous because the soldering process is very short which allows for in-line production, i.e. the component does not have to be removed from the production flow or balancing process. (Paragraph [0027]). Thus, applying a vacuum atmosphere would require incorporating a vacuum chamber into the process in which the shaft would be placed. This would lead to higher production costs and would entail a much larger technical outlay than applying a shielding gas to the soldering operation which would be contrary to the teachings of the present application. Thus, no motivation exists for combining Lürenbaum with Myers and Holland in this manner.

Accordingly, Lürenbaum, alone or in combination with Myers and Holland, fails to teach, suggest, or disclose at least this recitation of claim 1. Therefore, independent claim 1 is patentable over Lürenbaum in view of Myers and Holland. Applicants respectfully request that the rejection of the claim be withdrawn.

Dependent Claims 19-20 and 22-30

Dependent claims 19-20 and 22-30 are patentable at least by virtue of their direct or indirect dependence on patentable independent claim 1. Moreover, these claims contain additional subject matter that is independently patentable. For example, claim 30 also requires “at least a balancing of the hollow shaft and the soldering of the at least one balancing weight are carried out on a single machine.” This feature is not taught or shown in the recited prior art. Indeed, the claimed process is

advantageous because the soldering process is very short which allows for in-line production, i.e. the component does not have to be removed from the production flow or balancing process. (Paragraph [0027]). Thus, applying a vacuum atmosphere would require incorporating a separate vacuum chamber into the process in which the shaft would be placed, which would teach away from claim 30. Accordingly, withdrawal of the rejection is respectfully requested.

Independent Claim 31

Independent claim 31 recites, in part, “securing the at least one balancing weight to the at least one location by brazing without a shielding gas.” As discussed above in connection with claim 1, Lürenbaum, alone or in combination with Myers and Holland, fails to teach, suggest, or disclose at least this recitation of claim 31. Thus, the hollow shaft and shielding arguments presented above with respect to claim 1 are equally applicable here. Therefore, independent claim 31 is patentable over Lürenbaum in view of Myers and Holland. Applicants respectfully request that the rejection of the claim be withdrawn.

2. Lürenbaum (DE725619 Myers, Holland, and Porter (U.S. Patent No. 2,914,942))

Claim 29 was rejected under 35 U.S.C. 103(a) as being unpatentable over Lürenbaum, Myers, and Holland, and in further view of Porter.

Dependent claim 29 is directly dependent on independent claim 1. The remarks presented above with respect to the combination of Lürenbaum, Myers, and Holland are equally applicable here. Nor does Porter make up for the deficiencies of Lürenbaum, Myers, and Holland. Indeed, Porter also fails to disclose “securing the at least one balancing weight to the at least one location by soldering without a shielding gas, wherein a flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².”

Therefore, dependent claim 29 is patentable at least by virtue of its dependence on independent claim 1. Accordingly, withdrawal of the rejection is respectfully requested.

New Independent Claim 32

New independent claim 32 recites “[a] process for fixing at least one balancing weight to at least one location on a hollow shaft, for torque transmission at rotational speeds in the range of 3000 rpm to 12000 rpm in a drive system for a vehicle, comprising securing the at least one balancing weight to the at least one location by soldering without a shielding gas, wherein one of a tin-based and zinc-based flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm^2 .” Support for this claim can be found at least in Paragraphs [0020] and [0045] of the specification as published. Lürenbaum, Myers and Holland, alone or in reasonable combination with, fail to teach, suggest, or disclose every recitation of claim 32.

Holland is directed to a fluxless solder for application to metal surfaces, wherein the solder includes additives which remove contaminating oxides during the soldering process. (*See* Col. 2, lines 44-51). In the specification, Holland discloses use of a solder alloy comprising tin and lead that is alloyed with a reducing agent like lithium, calcium, strontium, or cesium. (Col. 2, lines 21-24). However, Holland fails to teach, suggest or disclose “one of a tin-based and zinc-based flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm^2 .”

Myers also fails to cure at least this deficiency of Holland. That is, Myers fails to teach, suggest, or disclose, at least, “one of a tin-based and zinc-based flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm^2 .” Indeed, as discussed above, Myers discloses the use of an adhesive material applied to the outer surface of the driveshaft section 17, the inner surface 44 of the balance weight 40, or both.

Lürenbaum also fails to cure at least this deficiency of Holland and Myers. Lürenbaum is directed toward balancing unbalanced shafts. According to a machine translation of the text of Lürenbaum, to balance the shafts, imbalance masses are welded on in the form of a sheet metal on the shaft body, which can be soldered or glued. (*See* translation, lines 1-3.) However, Lürenbaum

is silent regarding the specific solder used. Therefore, Lürenbaum fails to teach, suggest, or disclose “one of a tin-based and zinc-based flux-free solder is applied as a foil and a soldered joint between the hollow shaft and the at least one balancing weight has a soldered tensile strength greater than 100 N/mm².”

Accordingly, new independent claim 32 is patentable over Lürenbaum, Myers and Holland, alone or in reasonable combination.

New Dependent Claim 33

New dependent claim 33 is patentable at least by virtue of its direct dependence on independent claim 1. In addition, the dependent claim also recites additional features that are independently patentable over Lürenbaum, Myers and Holland, alone or in reasonable combination.

For example, new dependent claim 33 recites “the hollow shaft has a wall thickness of less than 2.0 mm.” Support for this claim can be found at least in Paragraph [0028] of the specification as published. Lürenbaum, Myers and Holland, alone or in reasonable combination, fail to teach, suggest, or disclose every recitation of claim 33.

New Dependent Claim 34

New dependent claim 34 is patentable at least by virtue of its direct dependence on independent claim 1. In addition, the dependent claim also recites additional features that are independently patentable over Lürenbaum, Myers and Holland, alone or in reasonable combination.

For example, new dependent claim 34 recites “the at least one balancing weight has a density of at least 7.0 g/cm³.” Support for this claim can be found at least in Paragraph [0042] of the specification as published. Lürenbaum, Myers and Holland, alone or in reasonable combination, fail to teach, suggest, or disclose every recitation of claim 34.

CONCLUSION

Reconsideration and allowance of the claims as presented are respectfully requested. In view of the above amendments and remarks, Applicants believe the pending application is in condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to allowance.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 18-0013, under Order No. 66969-0004 from which the undersigned is authorized to draw.

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